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(54) MANUFACTURING INK-JET TYPE LITHOGRAPHIC PLATE

(57)Abstract:

PROBLEM TO BE SOLVED: To produce many pieces of print having clear picture images, by employing a planographic process original plate which has a picture image receiving layer containing zinc oxide and an adhesive resin on a water resistant carrier, with a contacting angle between the surface of said picture receiving layer and water being larger than a specifically determined angle.

SOLUTION: This method employs a planographic process original plate which has a picture image receiving layer containing zinc oxide and an adhesive resin on a water resistant carrier, with a contact angle between the surface of said picture receiving layer and water being larger than a specifically determined angle. Preferably, the above contact angle is 55-110°. If a contact angle between the surface of said picture image receiving layer and water is controlled within the above range, the resulting picture image layer is sure to obtain a sufficient strength, thereby producing a clear picture containing fine lines and fine characters without any disturbed portions. Then, an oily ink is sprayed out in drops from a nozzle onto the picture image receiving layers, so as to form a predetermined picture image with the use of an ink-jet method. Subsequently, a chemical treatment for desensitization is performed on non- picture image portions on the picture image receiving layer so as to form a lithographic plate.

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 CLAIMS

[Claim(s)]

[Claim 1] It has the image acceptance layer which contains a zinc oxide and binding resin on a waterproof base material. The original edition for plate printing whose contact angle with the water of this image acceptance layer front face is 50 degrees or more is used. The creation approach of the ink jet type platemaking printing version which carries out desensitization processing of the non-image section of this image acceptance layer by chemical reaction processing, and is used as the lithography version after injecting oily ink liquid drop-like from a nozzle and forming an image by the ink jet method on this image acceptance layer.

[Claim 2] The creation approach of the ink jet type platemaking printing version of claim 1 that the smooth nature of the image acceptance layer front face of said original edition for lithography is more than 30 (a second / ten cc) in the Beck smoothness.

[Claim 3] Said oily ink is electric resistance 10⁹. The creation approach of the ink jet type platemaking printing version of claims 1 or 2 which distribute a solid-state and a hydrophobic resin particle in ordinary temperature at least in more than 0.001 cm and a with a dielectric constant of 3.5 or less non-aqueous solvent.

[Claim 4] The creation approach of one ink jet type platemaking printing version of claims 1-3 that the smooth nature of the front face of the side which adjoins the image acceptance layer of said base material is more than 300 (a second / ten cc) in the Beck smoothness.

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DETAILED DESCRIPTION

[Detailed Description of the Invention]

[0001]

[Field of the Invention] This invention relates to the creation approach of the ink jet type platemaking printing version with good platemaking image quality and printing image quality which used oily ink for the detail further about the creation approach of the lithography version of having used the ink jet recording method.

[0002]

[Description of the Prior Art] The offset lithography method which performs platemaking, i.e., image formation, to the straight-writing mold lithography original edition which has the image acceptance layer of a hydrophilic front face on a waterproof base material by various approaches in the inplant printing field with development of the latest business machine and progress of automation, and creates the printing version has spread.

[0003] The conventional plate for straight-writing mold lithography on the base material which consists of paper which performed deck-watertight-luminaire-ized processing, a plastic film, etc. The image acceptance layer (or image acceptance layer) containing an inorganic pigment, water soluble resin, a deck-watertight-luminaire-ized agent, etc. is prepared. The approach of using as the printing version by forming an oleophilic image by using oleophilic ink, and forming an oleophilic image by the typewriter or handwriting on such the original edition for straight-writing mold lithography, or carrying out the thermofusion imprint of the image from an ink ribbon with a thermal transfer printer is learned.

[0004] However, if the printing version created by such approach does not have the enough mechanical strength of the image section and it prints, it will produce lack of the image section easily.

[0005] Moreover, engraving the above-mentioned straight-writing mold plate printing original edition with an ink jet printer was also performed, and although the water color ink which used the dispersion medium as water at this time was also used, in water color ink, there was a problem that a blot arises in the image on a plate, or writing speed fell since desiccation is slow. In order to mitigate such a problem, the approach using the oily ink which made the dispersion medium the non-aqueous solvent is indicated by JP,54-117203,A.

[0006] However, also in this approach, when the printing version was formed, printed and seen actually, the blot of the image section was seen, and at most, printing number of sheets was also a limit and about hundreds of sheets were insufficient [number of sheets].

[0007]

[Problem(s) to be Solved by the Invention] This invention is made paying attention to the above-mentioned trouble, and is offering the creation approach of the ink jet type platemaking printing version made possible [several multi-sheet printing of the print of a clear image] for the object.

[0008]

[Means for Solving the Problem] The above-mentioned object is the following. (1) It is attained by this invention of - (4).

(1) It has the image acceptance layer which contains a zinc oxide and binding resin on a waterproof base

material. The original edition for plate printing whose contact angle with the water of this image acceptance layer front face is 50 degrees or more is used. The creation approach of the ink jet type platemaking printing version which carries out desensitization processing of the non-image section of this image acceptance layer by chemical reaction processing, and is used as the lithography version after injecting oily ink liquid drop-like from a nozzle and forming an image by the ink jet method on this image acceptance layer.

(2) The creation approach of the ink jet type platemaking printing version the above (1) that the smooth nature of the image acceptance layer front face of said original edition for lithography is more than 30 (a second / ten cc) in the Beck smoothness.

(3) Said oily ink is electric resistance 10⁹. The above (1) which distributes a solid-state and a hydrophobic resin particle in ordinary temperature at least in more than omega cm and a with a dielectric constant of 3.5 or less non-aqueous solvent, or the creation approach of the ink jet type platemaking printing version of (2).

(4) The creation approach of one ink jet type platemaking printing version of above-mentioned (1) - (3) that the smooth nature of the front face of the side which adjoins the image acceptance layer of said base material is more than 300 (a second / ten cc) in the Beck smoothness.

[0009]

[Embodiment of the Invention] Hereafter, the gestalt of operation of this invention is explained to a detail. Characterized by using oily ink for this invention and forming an image by the ink jet method on the image acceptance layer on the front face of hydrophobic, compatibility with the image acceptance layer pasted up thru/or stuck is fully held, and the formed image layer serves as the firm image section which cannot produce lack of an image layer etc. easily.

[0010] The image acceptance layer in this case will contain a zinc oxide and binding resin, and hydrophobic extent of that front face will be 50 degrees or more in a contact angle with water, and if ink receptiveness is taken into consideration, it will be 55 degrees - 110 degrees especially preferably 50 degrees - 120 degrees still more preferably 50 degrees - 130 degrees preferably.

[0011] If a contact angle with water is the above-mentioned range, the clear image which the reinforcement of an image layer which was described above is held enough, and does not produce turbulence of images, such as a thin line, a thin alphabetic character, and a halftone dot, will be formed.

[0012] In addition, a contact angle is the value measured by the sessile drop method with the contact angle meter using distilled water.

[0013] On the other hand, although the thing of disclosure uses the ink jet method using oily ink for JP, 54-117203, A like this invention, unlike this invention, the image acceptance layer front face of the original edition for printing is a hydrophilic property, and the contact angle with water is 40 degrees or less. And in such a thing, compared with this invention, image repeatability is remarkably inferior and print durability also falls remarkably.

[0014] In this invention, as for the smooth nature of an image acceptance layer front face, it is desirable that it is more than 30 (a second / ten cc) in the Beck smoothness, and it is 45-300 (a second / ten cc) more preferably.

[0015] When it considers as within the limits which described above the smooth nature of an image acceptance layer front face, while the clear image which does not produce the deficit of an image etc. is formed, the adhesion of the image section and an image acceptance layer also improves according to the improvement effectiveness of a faying surface product, and print durability's improves remarkably with 3000 or more sheets.

[0016] Furthermore, in this invention, image repeatability and print durability can be further raised by regulating the smooth nature of the front face of the side which adjoins the image acceptance layer of a base material with the Beck smoothness more than 300 (a second / ten cc). Even if such improvement effectiveness has the the same smooth nature of an image acceptance layer front face, it is acquired, and since the adhesion of the image section and an image acceptance layer improved because the smooth nature of a support surface increases, it is considered.

[0017] Here, with the Beck smoothness, it can measure with the Beck smoothness testing machine. A

test piece is pushed by the constant pressure (1kg/cm²) on the circular glass plate which has a hole in the center to which altitude was made flat and smooth, and, as for the Beck smoothness testing machine, the air of a constant rate (ten cc) measures the time amount taken to pass through between a glass side and test pieces under reduced pressure.

[0018] Moreover, the oily ink used for this invention is electric resistance 10⁹ preferably. More than omegacm and a with a dielectric constant of 3.5 or less non-aqueous solvent are made into a dispersion medium, and a solid-state and a hydrophobic resin particle are distributed in ordinary temperature (15 degrees C - 35 degrees C) at least. By using such a dispersion medium, the electric resistance of oily ink is controlled proper, and becomes proper [the regurgitation of the ink by electric field], and image quality improves. Moreover, while the increase of compatibility with an image acceptance layer and good image quality are acquired by using the above resin, print durability improves.

[0019] Furthermore, the creation approach of the platemaking printing version of this invention is explained. First, the original edition for lithography which has the image acceptance layer which contains a zinc oxide and binding resin at least on the waterproof base material with which this invention is presented is explained.

[0020] the zinc oxide with which this invention is presented -- for example, Japanese pigment American Institute of Technology editing -- like a publication to "new edition pigment handbook" 319 page, *****, and (1968 annual publications), although marketed as a zinc oxide, a zinc white, a wet zinc white, or an active white, any are sufficient.

[0021] namely, a zinc oxide -- a start raw material and the manufacture approach -- as dry process -- an French method (indirect method) and the United States -- what is called law (direct method) and a wet method -- it is -- for example, Forward Anabolism Study, Sakai Chemistry, Hakusui Chemistry, and Honjo chemical -- Co., Ltd. -- what is marketed from each company, such as Toho Zinc Co., Ltd. and Mitsui Mining & Smelting Industry, is mentioned.

[0022] moreover, the content in the image acceptance layer of a zinc oxide -- 10 - 25wt%, and further 12 - 22wt % it is -- things are desirable.

[0023] The effectiveness of this invention improves by considering as such a content. On the other hand, if the hydrophilization of the image acceptance layer front face by desensitization processing will become inadequate if the amount of zinc oxides decreases, the efficiency of this invention is not obtained but it increases not much, it becomes impossible to secure the required amount of binding resin, and is not desirable.

[0024] the binding resin with which the image acceptance layer of this invention is presented -- said hydrophobic resin with which an image acceptance layer is constituted with a zinc oxide, and the contact angle of the front face serves as the aforementioned predetermined range as carried out -- it is -- the molecular weight of the resin -- weight average molecular weight Mw -- it is -- desirable -- 103-105 -- more -- desirable -- 5x10³ to 5x10⁵ it is . Moreover, 0 degree C - 120 degrees C of glass transition points of this resin are 10-90 degrees C more preferably.

[0025] Specifically, a vinyl chloride vinyl acetate copolymer, a styrene-butadiene copolymer, a styrene-methacrylate copolymer, a methacrylate copolymer, an acrylate copolymer, a vinyl acetate copolymer, a polyvinyl butyral, alkyd resin, an epoxy resin, epoxy ester resin, polyester resin, polyurethane resin, etc. are mentioned.

[0026] These resin may be used independently and may use two or more sorts together.

[0027] As for the content of the resin in an image acceptance layer, it is desirable for the weight ratio of resin/zinc oxide to show, and to be referred to as 9 / 91 - 20/80.

[0028] The image acceptance layer of this invention may be made to contain other constituents with the above-mentioned component.

[0029] There are other inorganic pigments of the zinc oxide with which this invention is presented as other components which may be contained, and kaolin clay, a calcium carbonate, a barium carbonate, a calcium sulfate, a barium sulfate, a magnesium carbonate, titanium oxide, a silica, an alumina, etc. are mentioned as such an inorganic pigment, for example. When using other inorganic pigments of these together, it can use to the zinc oxide of this invention in the range which does not surpass 20 weight

sections.

[0030] Furthermore, JP,4-201387,A, 4-223196, 4-319491, 5-58071, 4-353495, and 5-119545 each official report etc. may be made to contain resin particles, such as an acrylic-acid-resin particle containing the specific functional group of a publication, for the improvement in desensitization of an image acceptance layer. these resin particles -- usually -- spherical -- the mean particle diameter -- 0.1-2 micrometers it is -- things are desirable.

[0031] The desensitization (hydrophilic property) of the non-image section by desensitization processing is fully made by other inorganic pigments or resin particles of these being used in the above-mentioned activity range, and the greasing of a print is controlled, and the image section fully sticks with an image acceptance layer, and sufficient print durability can be obtained, without producing the deficit of an image, even if printing number of sheets increases.

[0032] Generally binding resin is the rate of 10 - 25 weight section to the pigment 100 weight section, and the rate of the pigment (a zinc oxide is also included) / binding resin in an image acceptance layer is a rate of 13 - 22 weight section preferably. In this range, while the effectiveness of this invention is effectively discovered, maintenance of the film reinforcement at the time of printing or maintenance of the high hydrophilic property at the time of desensitization processing is made.

[0033] In addition, in an image acceptance layer, in order to raise film reinforcement more, a cross linking agent may be added.

[0034] The compound used by usually carrying out a cross linking agent as a cross linking agent can be mentioned. Specifically, the compound indicated by the Yamashita ****, "cross linking agent handbook" TAISEI CORP. ** (1981) edited by Tousuke Kaneko, Baifukan (1986) edited "a giant-molecule data handbook and a basic volume" by the Society of Polymer Science, Japan, etc. can be used.

[0035] In this invention, in order to promote the crosslinking reaction in the inside of an image acceptance layer, a reaction accelerator may be added if needed.

[0036] In the reaction format whose crosslinking reaction forms the chemical bond between functional groups for example, organic acids (an acetic acid, a propionic acid, butanoic acid, and benzenesulfonic acid --) phenols (a phenol and chlorophenol --), such as p-toluenesulfonic acid A nitrophenol, a cyano phenol, a BUROMO phenol, a naphthol, organometallic compounds (an acetylacetonato zirconium salt - -), such as dichlorophenol An acetylacetone zirconium salt, acetyl aceto cobalt salt, JIRAURIN acid dibutoxy tin, etc., Dithiocarbamic acid compounds (diethyldithiocarbamic acid salt etc.), CHINOURLAMUJI sulfidation **** (tetramethyl CHINOURLAMUJI disulfide etc.), Carboxylic anhydrides (a phthalic anhydride, maleic-anhydride, succinic-anhydride, butyl succinic-acid anhydride, 3, 3', 4, and 4'-tetracarboxylic acid benzo FENONJI anhydride, trimellitic anhydride, etc.) etc. are mentioned. When crosslinking reaction is a polymerization sexual response format, a polymerization initiator is used, for example, a peroxide, an azobis system compound, etc. are mentioned.

[0037] After binding resin applies an image acceptance layer constituent, it is desirable light and/or that heat curing is carried out. In order to perform heat curing, for example, desiccation conditions are made severer than the desiccation conditions at the time of the conventional image acceptance layer production. For example, it is desirable to make desiccation conditions into high temperature and/or long duration, or to heat-treat further after desiccation of a spreading solvent. For example, it processes for 5 - 120 minutes at 60 degrees C - 150 degrees C. If an above-mentioned reaction accelerator is used together, it can process on quieter conditions.

[0038] Moreover, what is necessary is to carry out photo-curing of the specific functional group in resin, and just to put in the process which carries out an optical exposure with a chemical activity beam of light as an approach of hardening by optical exposure. although any are sufficient as a visible ray, ultraviolet rays, far ultraviolet rays, an electron ray, an X-ray, a gamma ray, alpha rays, etc. as a chemical activity beam of light -- desirable -- ultraviolet rays -- it is the beam of light of the range of wavelength to 500nm wavelength of 310nm more preferably. Generally the mercury lamp of low voltage, high voltage, or extra-high voltage, a halogen lamp, etc. are used. Processing of an optical exposure can usually fully be performed by the exposure for [10 seconds -] 10 minutes after the

distance of 5cm - 50cm.

[0039] The coverage (after desiccation) of the image acceptance constituent per two shows 1m of original editions, and the thickness of the image acceptance layer in this invention is 3-30g. Considering as extent is desirable. Moreover, this image quality acceptance layer usually has 3-50vol % and the good thing which has the void content of 10 - 40vol % extent preferably.

[0040] The image acceptance layer of this invention is prepared on a waterproof base material. Paper or a plastic film etc. which laminated the paper, plastic film, or metallic foil which performed deck-watertight-luminaire-ized processing as a waterproof base material can be used.

[0041] As for the base material with which this invention is presented, it is desirable that the smooth nature of the front face of the side which adjoins an image acceptance layer is preferably adjusted to 900-3000 (a second / ten cc) more than 300 (a second / ten cc) with the Beck smoothness, and it is desirable that it is 1000-3000 (a second / ten cc) more preferably.

[0042] thus, high [of the regulated waterproof base material] -- when a smooth front face prepares the undershirt layer and overcoat layer which say the thing of the field where an image acceptance layer is applied directly, for example, are later mentioned on a base material, the thing of the front face of the undershirt layer and an overcoat layer is said.

[0043] Without this receiving the irregularity of the front face of a base material, the image acceptance layer to which the surface state was adjusted as mentioned above is fully held, and much more improvement in image quality of it is attained.

[0044] As an approach of setting it as the range of the above-mentioned smoothness, a well-known approach can be used conventionally variously. Specifically, the approach of adjusting the Beck smoothness of the front face of a base material etc. can be mentioned by approaches, such as the approach of carrying out melting adhesion of the base front face with resin, and calender strengthening with the heat roller of high smoothness.

[0045] It is desirable to consider as the approach of carrying out melting adhesion of the above-mentioned resin, and to be covered with the extrusion laminating method in this invention. By covering with this extrusion laminating method, the base material adjusted to desired smoothness can be made. After the extrusion laminating method fuses resin and makes this a film, it is the approach of cooling after being stuck to a stencil by pressure promptly, and laminating, and various equipments are known.

[0046] Thus, the thickness of the resin layer to laminate is 10 micrometers or more from the point of manufacture stability. desirable -- 10 micrometers - 30 micrometers it is .

[0047] Moreover, although an image acceptance layer can prepare a back coat layer (rear-face layer) for an undershirt layer in a reverse base material side for the purpose of curl prevention in this invention again in order to improve a water resisting property and layer indirect arrival nature between a base material and an image acceptance layer as mentioned above, as for a back coat layer, it is desirable that the range of the smoothness is 150-700 (a second / ten cc).

[0048] Thereby, when carrying out the ** version of the printing version to the offset press, the printing version is set to accuracy by the printing machine, without producing gap and a slide.

[0049] the thing of the undershirt layer which carries out multiple-times operation of the process of calender processing, and mentions later, and a back coat layer, for example, a pigment, for which smoothness controls comparatively with the combination of the adjustment on the presentation of - grain size etc. and adjustment of calender processing conditions is desirable as calender processing once performs for example, after the undershirt stratification and it carries out calender processing again after the back coat stratification, in boiling the smoothness of the undershirt layer of such a base material, and a back coat layer, respectively and adjusting it

[0050] As a base with which the original edition of this invention is presented, bases, such as a wood paper, synthetic-pulp paper, the mixed papermaking of wood pulp and a synthetic pulp, a nonwoven fabric, a plastic film, cloth, a metal sheet, and a these compound sheet-like object, can be used as they are. Moreover, in order to obtain the smoothness specified by this invention, and in order to adjust a water resisting property and other properties, impregnation processing of the coating which consists of the hydrophobic resin, water-dispersion or water soluble resin used by a below-mentioned undershirt

layer and a below-mentioned back coat layer on the above-mentioned base, a pigment, etc. may be carried out.

[0051] In this invention, while fulfilling printabilities, such as a recording characteristic, a water resisting property, and endurance, for example, it is desirable to use the base material which is required of the original edition for lithography and which prepared the undershirt layer and the back coat layer on said base that it should adjust to desired smoothness as mentioned above. Such an undershirt layer and a back coat layer are formed by applying and drying or laminating the coating liquid containing resin, a pigment, etc. on a base material. As resin used here, various kinds of resin chooses suitably and is used. As hydrophobic resin, acrylic resin, vinyl chloride system resin, styrene resin, styrene-butadiene system resin, styrene-acrylic resin, urethane system resin, vinylidene-chloride system resin, vinyl acetate system resin, etc. are mentioned, for example, and, specifically, for example, polyvinyl alcohol system resin, a cel roll system derivative, starch and its derivative, polyacrylamide system resin, a styrene maleic-anhydride system copolymer, etc. are mentioned as hydrophilic resin.

[0052] Moreover, as a pigment, clay, a kaolin, talc, the diatom earth, a calcium carbonate, an aluminum hydroxide, a magnesium hydroxide, titanium oxide, and micas are mentioned. Since comparatively advanced smooth nature is required [in / it is desirable to choose the grain size suitably and to use it, for example, / an undershirt layer] in order to attain desired smoothness, these pigments cut the thing and large drop child of the diameter of a granule, and they are specifically 8 micrometers. It is 0.5-5 micrometers preferably hereafter. The pigment of the grain size of extent is used preferably. Moreover, in what has a grain size larger since lower smoothness is required compared with an undershirt layer in a back coat layer, and a concrete target, it is 0.5-10 micrometers. The pigment of the grain size of extent is used preferably. In addition, as for the above pigments, it is desirable to be used at a rate of the 80 - 200 weight section in the 80 - 150 weight section and a back coat layer to the resin 100 weight section in an undershirt layer. In addition, as for an undershirt layer and a back coat layer, it is effective to contain deck-watertight-luminaire-ized agents, such as melamine system resin and polyamide epichlorohydrin system resin, in order to obtain the outstanding water resisting property. In addition, the above-mentioned particle size can be measured with a scanning electron microscope (SEM) photograph. Moreover, when a particle is not spherical, it is the diameter which converted and asked the circle for projected area.

[0053] the solution which generally contains a need ***** undershirt layer component in making the original edition for lithography of this invention in one field of a base material -- spreading desiccation - - carrying out -- an undershirt layer -- forming -- further -- the need -- that -- what is necessary is to carry out spreading desiccation of the coating liquid containing an image acceptance layer component, and just to form an image acceptance layer, after carrying out spreading desiccation of the solution containing a back coat layer component and forming a back coat layer in the field of ***** In addition, 1 - 30 g/m², especially 6 - 20 g/m² are suitable for the coverage of an image acceptance layer, an undershirt layer, and a back coat layer respectively.

[0054] as the thickness of a waterproof base material which prepared the undershirt layer or the back coat layer still more preferably -- 90-130 micrometers the range -- desirable -- 100-120 micrometers It is the range.

[0055] The oily ink used for this invention below is explained. The oily ink with which this invention is presented is electric resistance 109. It comes to distribute a solid-state and a hydrophobic resin particle in ordinary temperature in more than omegacm and a with a dielectric constant of 3.5 or less non-aqueous solvent at least.

[0056] Electric resistance 109 used for this invention There is a halogenation object of the aliphatic hydrocarbon of the shape of a straight chain and the letter of branching, alicyclic hydrocarbon or aromatic hydrocarbon, and these hydrocarbons preferably as a with more than omegacm and a dielectric constant of 3.5 or less non-aqueous solvent. for example, independent in octane, isooctane, Deccan, iso decane, decalin, nonane, dodecane, iso dodecane, cyclohexane, cyclooctane, cyclo decane, benzene, toluene, xylene, mesitylene, Isopar E, Isopar G, Isopar H, Isopar L (Isopar; trade name of Exxon company), shell ZORU 70, shell ZORU 71 (shell ZORU; trade name of shell oil company), AMUSUKO

OMS, and AMUSUKO 460 solvent (AMUSUKO; trade name of a spirits company) etc. -- or it mixes and uses. In addition, the upper limit of the electric resistance of such a non-aqueous solvent is about 1016ohmcm, and the lower limit of a dielectric constant is about 1.9.

[0057] Make the electric resistance of the non-aqueous solvent to be used into the above-mentioned range because the electric resistance of ink will not become proper but the regurgitation of the ink by electric field will worsen, if electric resistance becomes low, and let a dielectric constant be the above-mentioned range because electric field will become easy to be eased in ink and the regurgitation of ink will become easy to worsen by this, if a dielectric constant becomes high.

[0058] In the above-mentioned non-aqueous solvent, as a resin particle distributed Although what is necessary is just the particle of hydrophobic resin with sufficient compatibility with a non-aqueous solvent in solid form at the temperature of 35 degrees C or less Furthermore, the resin (P) the glass transition point of whose is -5 degrees C - 110 degrees C or 33 degrees C - 140 degrees C of softening temperatures is desirable. It is 10 degrees C - 100 degrees C of glass transition points, and 38 degrees C - 120 degrees C more preferably, and they are 15 degrees C - 80 degrees C of glass transition points, and 38 degrees C - 100 degrees C of softening temperatures still more preferably.

[0059] Since association of the increase of the compatibility of the image acceptance layer front face of the printing original edition and a resin particle and the resin particles on the printing original edition becomes less strong by using the resin of such a glass transition point or softening temperature, the adhesion of the image section and an image acceptance layer improves, and print durability improves. On the other hand, even if a glass transition point or softening temperature becomes low and it becomes high, the compatibility of an image acceptance layer front face and a resin particle will fall, or association of resin particles will become weak.

[0060] the weight average molecular weight Mw of resin (P) -- 1×10^3 to 1×10^6 it is -- desirable -- 5×10^3 to 8×10^5 -- more -- desirable -- 1×10^4 to 5×10^5 it is .

[0061] as such resin (P) -- concrete -- an olefin polymer and a copolymer (for example, polyethylene --) Polypropylene, a polyisobutylene, an ethylene-vinylacetate copolymer, An ethylene-acrylate copolymer, an ethylene-methacrylate copolymer, Vinyl chloride copolymers, such as an ethylene-methacrylic-acid copolymer For example, (a polyvinyl chloride, a vinyl chloride vinyl acetate copolymer), etc., A vinylidene-chloride copolymer, an alkane acid vinyl polymerization object, and a copolymer, the polymer of an alkane acid allyl compound polymer and a copolymer, styrene, and its derivative, and a copolymer (for example, Butadiene Styrene --) An isoprene-styrene copolymer, a styrene-methacrylate copolymer, Acrylonitrile copolymers, such as a styrene-acrylate copolymer, A methacrylonitrile copolymer, an alkyl vinyl ether copolymer, an acrylic ester polymer, and a copolymer, A methacrylic ester polymer and a copolymer, an itaconic-acid diester polymer, and a copolymer, A maleic-anhydride copolymer, an acrylamide copolymer, a methacrylamide copolymer, Phenol resin, alkyd resin, polycarbonate resin, ketone resin, Polyester resin, silicon resin, amide resin, a hydroxyl group, and carboxyl group denaturation polyester ETERU resin, Butyral resin, polyvinyl-acetal resin, urethane resin, rosin system resin, Hydrogenation rosin resin, petroleum resin, hydrogenation petroleum resin, maleic resin, Terpene resin, hydrogenation terpene resin, chroman-indene resin, a cyclized-rubber-methacrylic ester copolymer, A cyclized-rubber-acrylic ester copolymer, the copolymer containing the heterocycle which does not contain a nitrogen atom (it considers as heterocycle) Epoxy resins, such as furan ring, tetrahydrofuran ring, thiophene ring, dioxane ring, dioxo furan ring, lactone ring, benzofuran ring, benzothiophene ring, 1, and 3-JIOKI cetane ring, etc. are mentioned.

[0062] As for the content of the distributed resin particle in the oily ink of this invention, it is desirable to carry out to 0.5 - 20wt% of the whole ink. The compatibility of ink and the image acceptance layer of the printing original edition becomes will be hard to be acquired if a content decreases, and it becomes easy to produce the problem of a good image no longer being obtained or print durability falling, and on the other hand, when a content increases, that uniform dispersion liquid are hard to be obtained, it becomes, or is easy to be generated in the blinding of the ink in a discharge head, and problems -- the stable ink regurgitation is hard to be obtained -- are.

[0063] It is desirable to make color material contain as a coloring component in the oily ink with which

this invention is presented for carrying out the ** version of the version after platemaking with the aforementioned distributed resin particle etc.

[0064] Which is usable if it is the pigment and color which are used for the liquid development agent for an oily ink constituent or electrostatic photographs from the former as a color material.

[0065] As a pigment, an inorganic pigment and an organic pigment cannot be asked but what is generally used by the technical field of printing can be used. It can use without specifically limiting especially a pigment with conventionally well-known carbon black, cadmium red, molybdate red, chrome yellow, cadmium yellow, titan yellow, chromic oxide, kinky thread JIAN, titanium cobalt green, ultra marine blue, Prussian blue, cobalt blue, an azo system pigment, a phthalocyanine system pigment, the Quinacridone system pigment, an isoindolinone system pigment, a dioxazine system pigment, the Indanthrene system pigment, a perylene system pigment, a peri non system pigment, a thioindigo system pigment, a kino FUTARON system pigment, a metal complex pigment, etc.

[0066] As a color, oil colors, such as azo dye, metal complex dye, naphthol dye, anthraquinone dye, an indigo color, a carbonium pigment, a quinonimine dye, xanthene dye, cyanine dye, quinoline dye, nitro dye, nitroso dye, a benzoquinone color, a naphthoquinone color, phthalocyanine dye, and metal phthalocyanine dye, are desirable.

[0067] Although it is also possible to use these pigments and colors independently, and to use it, combining suitably, it is desirable to contain in 0.01 - 5% of the weight of the range to the whole ink.

[0068] You may make it distribute in a non-aqueous solvent by making the color material itself into a particulate material apart from a distributed resin particle, and such color material may be made to contain in a distributed resin particle. When making it contain, the approach of a pigment of covering with the resin ingredient of a distributed resin particle, and making it into a resin coated particle etc. is common, and the approach of a color of coloring the surface section of a distributed resin particle and making it into a coloring particle etc. is common.

[0069] the resin particle distributed in the non-aqueous solvent of this invention -- further -- a coloring particle etc. -- including -- the mean particle diameter of these particles -- 0.05 micrometers - 5 micrometers It is desirable. more -- desirable -- 0.1 micrometers - 1.0 micrometers it is -- further -- desirable -- 0.1 micrometers - 0.5 micrometers It is the range. It asks for this particle size by CAPA-500 (trade name by Horiba, Ltd.).

[0070] The nonaqueous distribution resin particle used for this invention can be conventionally manufactured by the well-known mechanical grinding approach or the polymerization granulation approach. As the mechanical grinding approach, if needed, mix the ingredient made into a resin particle and a well-known grinder grinds directly conventionally through melting and kneading. The approach of considering as a particle, using a distributed polymer together, and distributing further by wet dispersers (for example, a ball mill paint shaker, KEDEIMIRU, dynamill, etc.), and the ingredient used as a resin particle component, It grinds, after kneading a distributed auxiliary polymer (or coat polymer) beforehand and considering as a kneading object, and the approach of making a distributed polymer live together next and distributing etc. is mentioned. The manufacture approach of a coating or the liquid development agent for electrostatic photographs can specifically be used. About these For example, Kenji Ueki supervision-of-translation ("floating and pigment-content powder" of coating) KYORITSU SHUPPAN (1971), "Solomon, the science of a coating", and "Paint and Surface Coating Theory and Practice", It is indicated by compendiums, such as Yuji Harasaki "coating engineering" Asakura Publishing (1971) and Yuji Harasaki "fundamental science of coating" Maki-Shoten Publishing (1977).

[0071] As a polymerization corning method, a well-known nonaqueous distribution polymerization method is mentioned conventionally. Moreover, specifically CMC publication (1991) of Chapter 2 Soichi Muroi editorial supervision "the latest technique of an ultrafine particle polymer" -- the volume ("development and utilization" of the latest electrophotography development system and a toner ingredient) for Koichi Nakamura -- Chapter 3 (Japanese Science-information 1985 annual-publications) KE.J.Barrett "Dispersion Polymerization in Organic Media" John Wiley (1975 year) etc. -- it is indicated by the compendium.

[0072] Usually, a distributed polymer is used together in order to carry out distributed stabilization of

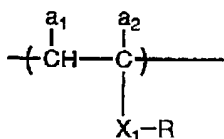
the particulate material in a non-aqueous solvent. A distributed polymer contains the repeat unit of fusibility as a principal component in a non-aqueous solvent, and average molecular weight is 1×10^3 to 1×10^6 at weight average molecular weight M_w . It is 5×10^3 to 5×10^5 preferably and more preferably. It is the range.

[0073] As a repeat unit of the desirable fusibility of the distributed polymer with which this invention is presented, the polymerization component shown by the following general formula (I) is mentioned.

[0074]

[Formula 1]

一般式(I)



[0075] It sets to a general formula (I) and is X_1 . $-\text{COO}-$, $-\text{OCO}-$, or $-\text{O}-$ is expressed.

[0076] You may have the substituent, although R expresses the alkyl group or alkenyl radical of carbon numbers 10-32, the alkyl group or alkenyl radical of carbon numbers 10-22 is expressed preferably, the shape of a straight chain and the letter of branching are sufficient as these and a non-permuted thing is desirable.

[0077] Specifically, a decyl group, the dodecyl, a tridecyl radical, a tetradecyl radical, a hexadecyl radical, an octadecyl radical, an eicosanyl radical, a docosa nil radical, a decenyl radical, a dodecenyl radical, a tridecenyl radical, a hexa decenyl radical, an octadecenyl radical, a RINORERU radical, etc. are mentioned.

[0078] a_1 And a_2 even when it is mutually the same -- differing -- **** -- desirable -- a hydrogen atom - Halogen atoms (for example, a chlorine atom, a bromine atom, etc.), a cyano group, the alkyl group of carbon numbers 1-3 (Methyl group, ethyl group, propyl group, etc. and -) COO-Z1 Or $-\text{CH}_2 \text{COO-Z1}$ [Z1 [for example,]] showing a hydrogen atom or the with a carbon number of 22 or less hydrocarbon groups (for example, an alkyl group, an alkenyl radical, an aralkyl radical, an alicyclic radical, an aryl group, etc.) which may be permuted is expressed.

[0079] Z1 A hydrocarbon group besides a hydrogen atom is specifically expressed. As a desirable hydrocarbon group the alkyl group (for example, a methyl group --) by which carbon numbers 1-22 may be permuted An ethyl group, a propyl group, butyl, a heptyl radical, a hexyl group, an octyl radical, A nonyl radical, a decyl group, the dodecyl, a tridecyl radical, a tetradecyl radical, A hexadecyl radical, an octadecyl radical, an eicosanyl radical, a docosa nil radical, 2-chloro ethyl group, 2-BUROMO ethyl group, 2-cyano ethyl group, 2-methoxy carbonylethyl radical, Alkenyl radicals by which carbon numbers 4-18 may be permuted, such as 2-methoxy ethyl group and 3-BUROMO propyl group

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TECHNICAL FIELD

[Field of the Invention] This invention relates to the creation approach of the ink jet type platemaking printing version with good platemaking image quality and printing image quality which used oily ink for the detail further about the creation approach of the lithography version of having used the ink jet recording method.

[Translation done.]

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EFFECT OF THE INVENTION

[Effect of the Invention] According to this invention, the printing version which the print of a clear image was obtained and was excellent in print durability can be created.

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MEANS

[Means for Solving the Problem] The above-mentioned object is the following. (1) It is attained by this invention of - (4).

(1) It has the image acceptance layer which contains a zinc oxide and binding resin on a waterproof base material. The original edition for plate printing whose contact angle with the water of this image acceptance layer front face is 50 degrees or more is used. The creation approach of the ink jet type platemaking printing version which carries out desensitization processing of the non-image section of this image acceptance layer by chemical reaction processing, and is used as the lithography version after injecting oily ink liquid drop-like from a nozzle and forming an image by the ink jet method on this image acceptance layer.

(2) The creation approach of the ink jet type platemaking printing version the above (1) that the smooth nature of the image acceptance layer front face of said original edition for lithography is more than 30 (a second / ten cc) in the Beck smoothness.

(3) Said oily ink is electric resistance 10⁹. The above (1) which distributes a solid-state and a hydrophobic resin particle in ordinary temperature at least in more than omega cm and a with a dielectric constant of 3.5 or less non-aqueous solvent, or the creation approach of the ink jet type platemaking printing version of (2).

(4) The creation approach of one ink jet type platemaking printing version of above-mentioned (1) - (3) that the smooth nature of the front face of the side which adjoins the image acceptance layer of said base material is more than 300 (a second / ten cc) in the Beck smoothness.

[0009]

[Embodiment of the Invention] Hereafter, the gestalt of operation of this invention is explained to a detail. Characterized by using oily ink for this invention and forming an image by the ink jet method on the image acceptance layer on the front face of hydrophobic, compatibility with the image acceptance layer pasted up thru/or stuck is fully held, and the formed image layer serves as the firm image section which cannot produce lack of an image layer etc. easily.

[0010] The image acceptance layer in this case will contain a zinc oxide and binding resin, and hydrophobic extent of that front face will be 50 degrees or more in a contact angle with water, and if ink receptiveness is taken into consideration, it will be 55 degrees - 110 degrees especially preferably 50 degrees - 120 degrees still more preferably 50 degrees - 130 degrees preferably.

[0011] If a contact angle with water is the above-mentioned range, the clear image which the reinforcement of an image layer which was described above is held enough, and does not produce turbulence of images, such as a thin line, a thin alphabetic character, and a halftone dot, will be formed.

[0012] In addition, a contact angle is the value measured by the sessile drop method with the contact angle meter using distilled water.

[0013] On the other hand, although the thing of disclosure uses the ink jet method using oily ink for JP,54-117203,A like this invention, unlike this invention, the image acceptance layer front face of the original edition for printing is a hydrophilic property, and the contact angle with water is 40 degrees or less. And in such a thing, compared with this invention, image repeatability is remarkably inferior and

print durability also falls remarkably.

[0014] In this invention, as for the smooth nature of an image acceptance layer front face, it is desirable that it is more than 30 (a second / ten cc) in the Beck smoothness, and it is 45-300 (a second / ten cc) more preferably.

[0015] When it considers as within the limits which described above the smooth nature of an image acceptance layer front face, while the clear image which does not produce the deficit of an image etc. is formed, the adhesion of the image section and an image acceptance layer also improves according to the improvement effectiveness of a faying surface product, and print durability's improves remarkably with 3000 or more sheets.

[0016] Furthermore, in this invention, image repeatability and print durability can be further raised by regulating the smooth nature of the front face of the side which adjoins the image acceptance layer of a base material with the Beck smoothness more than 300 (a second / ten cc). Even if such improvement effectiveness has the the same smooth nature of an image acceptance layer front face, it is acquired, and since the adhesion of the image section and an image acceptance layer improved because the smooth nature of a support surface increases, it is considered.

[0017] Here, with the Beck smoothness, it can measure with the Beck smoothness testing machine. A test piece is pushed by the constant pressure (1kg/cm²) on the circular glass plate which has a hole in the center to which altitude was made flat and smooth, and, as for the Beck smoothness testing machine, the air of a constant rate (ten cc) measures the time amount taken to pass through between a glass side and test pieces under reduced pressure.

[0018] Moreover, the oily ink used for this invention is electric resistance 10⁹ preferably. More than omegacm and a with a dielectric constant of 3.5 or less non-aqueous solvent are made into a dispersion medium, and a solid-state and a hydrophobic resin particle are distributed in ordinary temperature (15 degrees C - 35 degrees C) at least. By using such a dispersion medium, the electric resistance of oily ink is controlled proper, and becomes proper [the regurgitation of the ink by electric field], and image quality improves. Moreover, while the increase of compatibility with an image acceptance layer and good image quality are acquired by using the above resin, print durability improves.

[0019] Furthermore, the creation approach of the platemaking printing version of this invention is explained. First, the original edition for lithography which has the image acceptance layer which contains a zinc oxide and binding resin at least on the waterproof base material with which this invention is presented is explained.

[0020] the zinc oxide with which this invention is presented -- for example, Japanese pigment American Institute of Technology editing -- like a publication to "new edition pigment handbook" 319 page, *****, and (1968 annual publications), although marketed as a zinc oxide, a zinc white, a wet zinc white, or an active white, any are sufficient.

[0021] namely, a zinc oxide -- a start raw material and the manufacture approach -- as dry process -- an French method (indirect method) and the United States -- what is called law (direct method) and a wet method -- it is -- for example, Forward Anabolism Study, Sakai Chemistry, Hokusui Chemistry, and Honjo chemical -- Co., Ltd. -- what is marketed from each company, such as Toho Zinc Co., Ltd. and Mitsui Mining & Smelting Industry, is mentioned.

[0022] moreover, the content in the image acceptance layer of a zinc oxide -- 10 - 25wt%, and further 12 - 22wt % it is -- things are desirable.

[0023] The effectiveness of this invention improves by considering as such a content. On the other hand, if the hydrophilization of the image acceptance layer front face by desensitization processing will become inadequate if the amount of zinc oxides decreases, the efficiency of this invention is not obtained but it increases not much, it becomes impossible to secure the required amount of binding resin, and is not desirable.

[0024] the binding resin with which the image acceptance layer of this invention is presented -- said hydrophobic resin with which an image acceptance layer is constituted with a zinc oxide, and the contact angle of the front face serves as the aforementioned predetermined range as carried out -- it is -- the molecular weight of the resin -- weight average molecular weight Mw -- it is -- desirable -- 103-105 --

more -- desirable -- 5×10^3 to 5×10^5 it is . Moreover, 0 degree C - 120 degrees C of glass transition points of this resin are 10-90 degrees C more preferably.

[0025] Specifically, a vinyl chloride vinyl acetate copolymer, a styrene-butadiene copolymer, a styrene-methacrylate copolymer, a methacrylate copolymer, an acrylate copolymer, a vinyl acetate copolymer, a polyvinyl butyral, alkyd resin, an epoxy resin, epoxy ester resin, polyester resin, polyurethane resin, etc. are mentioned.

[0026] These resin may be used independently and may use two or more sorts together.

[0027] As for the content of the resin in an image acceptance layer, it is desirable for the weight ratio of resin/zinc oxide to show, and to be referred to as 9 / 91 - 20/80.

[0028] The image acceptance layer of this invention may be made to contain other constituents with the above-mentioned component.

[0029] There are other inorganic pigments of the zinc oxide with which this invention is presented as other components which may be contained, and kaolin clay, a calcium carbonate, a barium carbonate, a calcium sulfate, a barium sulfate, a magnesium carbonate, titanium oxide, a silica, an alumina, etc. are mentioned as such an inorganic pigment, for example. When using other inorganic pigments of these together, it can use to the zinc oxide of this invention in the range which does not surpass 20 weight sections.

[0030] Furthermore, JP,4-201387,A, 4-223196, 4-319491, 5-58071, 4-353495, and 5-119545 each official report etc. may be made to contain resin particles, such as an acrylic-acid-resin particle containing the specific functional group of a publication, for the improvement in desensitization of an image acceptance layer. these resin particles -- usually -- spherical -- the mean particle diameter -- 0.1-2 micrometers it is -- things are desirable.

[0031] The desensitization (hydrophilic property) of the non-image section by desensitization processing is fully made by other inorganic pigments or resin particles of these being used in the above-mentioned activity range, and the greasing of a print is controlled, and the image section fully sticks with an image acceptance layer, and sufficient print durability can be obtained, without producing the deficit of an image, even if printing number of sheets increases.

[0032] Generally binding resin is the rate of 10 - 25 weight section to the pigment 100 weight section, and the rate of the pigment (a zinc oxide is also included) / binding resin in an image acceptance layer is a rate of 13 - 22 weight section preferably. In this range, while the effectiveness of this invention is effectively discovered, maintenance of the film reinforcement at the time of printing or maintenance of the high hydrophilic property at the time of desensitization processing is made.

[0033] In addition, in an image acceptance layer, in order to raise film reinforcement more, a cross linking agent may be added.

[0034] The compound used by usually carrying out a cross linking agent as a cross linking agent can be mentioned. Specifically, the compound indicated by the Yamashita ****, "cross linking agent handbook" TAISEI CORP. ** (1981) edited by Tousuke Kaneko, Baifukan (1986) edited "a giant-molecule data handbook and a basic volume" by the Society of Polymer Science, Japan, etc. can be used.

[0035] In this invention, in order to promote the crosslinking reaction in the inside of an image acceptance layer, a reaction accelerator may be added if needed.

[0036] In the reaction format whose crosslinking reaction forms the chemical bond between functional groups for example, organic acids (an acetic acid, a propionic acid, butanoic acid, and benzenesulfonic acid --) phenols (a phenol and chlorophenol --), such as p-toluenesulfonic acid A nitrophenol, a cyano phenol, a BUROMO phenol, a naphthol, organometallic compounds (an acetylacetonato zirconium salt -), such as dichlorophenol An acetylacetone zirconium salt, acetyl aceto cobalt salt, JIRAURIN acid dibutoxy tin, etc., Dithiocarbamic acid compounds (diethyldithiocarbamic acid salt etc.), CHINOURLAMUJI sulfidation **** (tetramethyl CHINOURLAMUJI disulfide etc.), Carboxylic anhydrides (a phthalic anhydride, maleic-anhydride, succinic-anhydride, butyl succinic-acid anhydride, 3, 3', 4, and 4'-tetracarboxylic acid benzo FENONJI anhydride, trimellitic anhydride, etc.) etc. are mentioned. When crosslinking reaction is a polymerization sexual response format, a polymerization initiator is used, for

example, a peroxide, an azobis system compound, etc. are mentioned.

[0037] After binding resin applies an image acceptance layer constituent, it is desirable light and/or that heat curing is carried out. In order to perform heat curing, for example, desiccation conditions are made severer than the desiccation conditions at the time of the conventional image acceptance layer production. For example, it is desirable to make desiccation conditions into high temperature and/or long duration, or to heat-treat further after desiccation of a spreading solvent. For example, it processes for 5 - 120 minutes at 60 degrees C - 150 degrees C. If an above-mentioned reaction accelerator is used together, it can process on quieter conditions.

[0038] Moreover, what is necessary is to carry out photo-curing of the specific functional group in resin, and just to put in the process which carries out an optical exposure with a chemical activity beam of light as an approach of hardening by optical exposure. although any are sufficient as a visible ray, ultraviolet rays, far ultraviolet rays, an electron ray, an X-ray, a gamma ray, alpha rays, etc. as a chemical activity beam of light -- desirable -- ultraviolet rays -- it is the beam of light of the range of wavelength to 500nm wavelength of 310nm more preferably. Generally the mercury lamp of low voltage, high voltage, or extra-high voltage, a halogen lamp, etc. are used. Processing of an optical exposure can usually fully be performed by the exposure for [10 seconds -] 10 minutes after the distance of 5cm - 50cm.

[0039] The coverage (after desiccation) of the image acceptance constituent per two shows 1m of original editions, and the thickness of the image acceptance layer in this invention is 3-30g. Considering as extent is desirable. Moreover, this image quality acceptance layer usually has 3-50vol % and the good thing which has the void content of 10 - 40vol % extent preferably.

[0040] The image acceptance layer of this invention is prepared on a waterproof base material. Paper or a plastic film etc. which laminated the paper, plastic film, or metallic foil which performed deck-watertight-luminaire-ized processing as a waterproof base material can be used.

[0041] As for the base material with which this invention is presented, it is desirable that the smooth nature of the front face of the side which adjoins an image acceptance layer is preferably adjusted to 900-3000 (a second / ten cc) more than 300 (a second / ten cc) with the Beck smoothness, and it is desirable that it is 1000-3000 (a second / ten cc) more preferably.

[0042] thus, high [of the regulated waterproof base material] -- when a smooth front face prepares the undershirt layer and overcoat layer which say the thing of the field where an image acceptance layer is applied directly, for example, are later mentioned on a base material, the thing of the front face of the undershirt layer and an overcoat layer is said.

[0043] Without this receiving the irregularity of the front face of a base material, the image acceptance layer to which the surface state was adjusted as mentioned above is fully held, and much more improvement in image quality of it is attained.

[0044] As an approach of setting it as the range of the above-mentioned smoothness, a well-known approach can be used conventionally variously. Specifically, the approach of adjusting the Beck smoothness of the front face of a base material etc. can be mentioned by approaches, such as the approach of carrying out melting adhesion of the base front face with resin, and calender strengthening with the heat roller of high smoothness.

[0045] It is desirable to consider as the approach of carrying out melting adhesion of the above-mentioned resin, and to be covered with the extrusion laminating method in this invention. By covering with this extrusion laminating method, the base material adjusted to desired smoothness can be made. After the extrusion laminating method fuses resin and makes this a film, it is the approach of cooling after being stuck to a stencil by pressure promptly, and laminating, and various equipments are known.

[0046] Thus, the thickness of the resin layer to laminate is 10 micrometers or more from the point of manufacture stability. desirable -- 10 micrometers - 30 micrometers it is .

[0047] Moreover, although an image acceptance layer can prepare a back coat layer (rear-face layer) for an undershirt layer in a reverse base material side for the purpose of curl prevention in this invention again in order to improve a water resisting property and layer indirect arrival nature between a base material and an image acceptance layer as mentioned above, as for a back coat layer, it is desirable that

the range of the smoothness is 150-700 (a second / ten cc).

[0048] Thereby, when carrying out the ** version of the printing version to the offset press, the printing version is set to accuracy by the printing machine, without producing gap and a slide.

[0049] the thing of the undershirt layer which carries out multiple-times operation of the process of calender processing, and mentions later, and a back coat layer, for example, a pigment, for which smoothness controls comparatively with the combination of the adjustment on the presentation of - grain size etc. and adjustment of calender processing conditions is desirable as calender processing once performs for example, after the undershirt stratification and it carries out calender processing again after the back coat stratification, in boiling the smoothness of the undershirt layer of such a base material, and a back coat layer, respectively and adjusting it

[0050] As a base with which the original edition of this invention is presented, bases, such as a wood paper, synthetic-pulp paper, the mixed papermaking of wood pulp and a synthetic pulp, a nonwoven fabric, a plastic film, cloth, a metal sheet, and a these compound sheet-like object, can be used as they are. Moreover, in order to obtain the smoothness specified by this invention, and in order to adjust a water resisting property and other properties, impregnation processing of the coating which consists of the hydrophobic resin, water-dispersion or water soluble resin used by a below-mentioned undershirt layer and a below-mentioned back coat layer on the above-mentioned base, a pigment, etc. may be carried out.

[0051] In this invention, while fulfilling printabilities, such as a recording characteristic, a water resisting property, and endurance, for example, it is desirable to use the base material which is required of the original edition for lithography and which prepared the undershirt layer and the back coat layer on said base that it should adjust to desired smoothness as mentioned above. Such an undershirt layer and a back coat layer are formed by applying and drying or laminating the coating liquid containing resin, a pigment, etc. on a base material. As resin used here, various kinds of resin chooses suitably and is used. As hydrophobic resin, acrylic resin, vinyl chloride system resin, styrene resin, styrene-butadiene system resin, styrene-acrylic resin, urethane system resin, vinylidene-chloride system resin, vinyl acetate system resin, etc. are mentioned, for example, and, specifically, for example, polyvinyl alcohol system resin, a cel roll system derivative, starch and its derivative, polyacrylamide system resin, a styrene maleic-anhydride system copolymer, etc. are mentioned as hydrophilic resin.

[0052] Moreover, as a pigment, clay, a kaolin, talc, the diatom earth, a calcium carbonate, an aluminum hydroxide, a magnesium hydroxide, titanium oxide, and micas are mentioned. Since comparatively advanced smooth nature is required [in / it is desirable to choose the grain size suitably and to use it, for example, / an undershirt layer] in order to attain desired smoothness, these pigments cut the thing and large drop child of the diameter of a granule, and they are specifically 8 micrometers. It is 0.5-5 micrometers preferably hereafter. The pigment of the grain size of extent is used preferably. Moreover, in what has a grain size larger since lower smoothness is required compared with an undershirt layer in a back coat layer, and a concrete target, it is 0.5-10 micrometers. The pigment of the grain size of extent is used preferably. In addition, as for the above pigments, it is desirable to be used at a rate of the 80 - 200 weight section in the 80 - 150 weight section and a back coat layer to the resin 100 weight section in an undershirt layer. In addition, as for an undershirt layer and a back coat layer, it is effective to contain deck-watertight-luminaire-ized agents, such as melamine system resin and polyamide epichlorohydrin system resin, in order to obtain the outstanding water resisting property. In addition, the above-mentioned particle size can be measured with a scanning electron microscope (SEM) photograph. Moreover, when a particle is not spherical, it is the diameter which converted and asked the circle for projected area.

[0053] the solution which generally contains a need ***** undershirt layer component in making the original edition for lithography of this invention in one field of a base material -- spreading desiccation - - carrying out -- an undershirt layer -- forming -- further -- the need -- that -- what is necessary is to carry out spreading desiccation of the coating liquid containing an image acceptance layer component, and just to form an image acceptance layer, after carrying out spreading desiccation of the solution containing a back coat layer component and forming a back coat layer in the field of ***** In addition,

1 - 30 g/m², especially 6 - 20 g/m² are suitable for the coverage of an image acceptance layer, an undershirt layer, and a back coat layer respectively.

[0054] as the thickness of a waterproof base material which prepared the undershirt layer or the back coat layer still more preferably -- 90-130 micrometers the range -- desirable -- 100-120 micrometers It is the range.

[0055] The oily ink used for this invention below is explained. The oily ink with which this invention is presented is electric resistance 10⁹. It comes to distribute a solid-state and a hydrophobic resin particle in ordinary temperature in more than megacm and a with a dielectric constant of 3.5 or less non-aqueous solvent at least.

[0056] Electric resistance 10⁹ used for this invention There is a halogenation object of the aliphatic hydrocarbon of the shape of a straight chain and the letter of branching, alicyclic hydrocarbon or aromatic hydrocarbon, and these hydrocarbons preferably as a with more than megacm and a dielectric constant of 3.5 or less non-aqueous solvent. for example, independent in octane, isooctane, Deccan, iso decane, decalin, nonane, dodecane, iso dodecane, cyclohexane, cyclooctane, cyclo decane, benzene, toluene, xylene, mesitylene, Isopar E, Isopar G, Isopar H, Isopar L (Isopar; trade name of Exxon company), shell ZORU 70, shell ZORU 71 (shell ZORU; trade name of shell oil company), AMUSUKO OMS, and AMUSUKO 460 solvent (AMUSUKO; trade name of a spirits company) etc. -- or it mixes and uses. In addition, the upper limit of the electric resistance of such a non-aqueous solvent is about 10¹⁶ohmcm, and the lower limit of a dielectric constant is about 1.9.

[0057] Make the electric resistance of the non-aqueous solvent to be used into the above-mentioned range because the electric resistance of ink will not become proper but the regurgitation of the ink by electric field will worsen, if electric resistance becomes low, and let a dielectric constant be the above-mentioned range because electric field will become are easy to be eased in ink and the regurgitation of ink will become easy to worsen by this, if a dielectric constant becomes high.

[0058] In the above-mentioned non-aqueous solvent, as a resin particle distributed Although what is necessary is just the particle of hydrophobic resin with sufficient compatibility with a non-aqueous solvent in solid form at the temperature of 35 degrees C or less Furthermore, the resin (P) the glass transition point of whose is -5 degrees C - 110 degrees C or 33 degrees C - 140 degrees C of softening temperatures is desirable. It is 10 degrees C - 100 degrees C of glass transition points, and 38 degrees C - 120 degrees C more preferably, and they are 15 degrees C - 80 degrees C of glass transition points, and 38 degrees C - 100 degrees C of softening temperatures still more preferably.

[0059] Since association of the increase of the compatibility of the image acceptance layer front face of the printing original edition and a resin particle and the resin particles on the printing original edition becomes less strong by using the resin of such a glass transition point or softening temperature, the adhesion of the image section and an image acceptance layer improves, and print durability improves. On the other hand, even if a glass transition point or softening temperature becomes low and it becomes high, the compatibility of an image acceptance layer front face and a resin particle will fall, or association of resin particles will become weak.

[0060] the weight average molecular weight Mw of resin (P) -- 1x10³ to 1x10⁶ it is -- desirable -- 5x10³ to 8x10⁵ -- more -- desirable -- 1x10⁴ to 5x10⁵ it is .

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DESCRIPTION OF DRAWINGS

[Brief Description of the Drawings]

[Drawing 1] It is the outline block diagram showing an example of the equipment system used for this invention.

[Drawing 2] It is the outline block diagram showing the important section of the ink jet recording device used for this invention.

[Drawing 3] It is the fragmentary sectional view of the head of the ink jet recording device used for this invention.

[Description of Notations]

1 Ink Jet Recording Device

2 Master

3 Computer

4 Pass

10 Head

10a Regurgitation slit

10b Discharge electrode

10c Counterelectrode

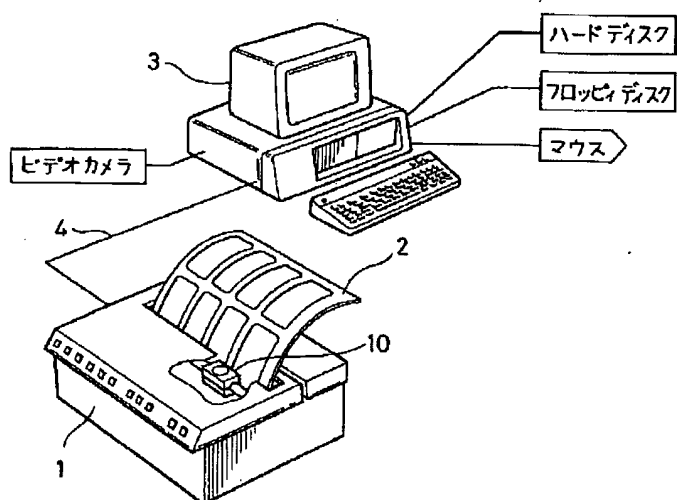
11 Oily Ink

101 Up Unit


102 Lower Unit

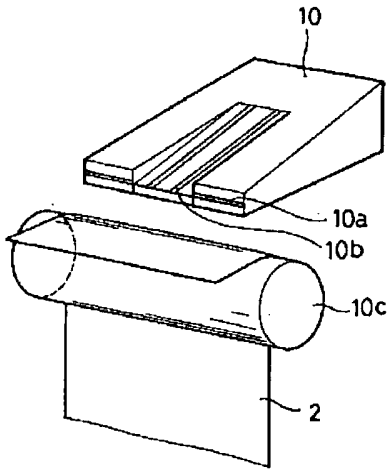
[Translation done.]

Drawing selection drawing 1



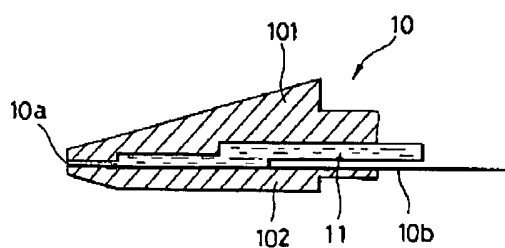
[Translation done.]

Drawing selection drawing 2 



[Translation done.]

Drawing selection drawing 3



[Translation done.]